positioning capabilities of other HTML functions such as background images, frames, horizontal and vertical image offsets and others.

An example of such an information response is:

<HTML> <BODY background="http://multimap.com?lon=-0.1666&lat=51.545&scale=25000&xp=500&yp=300"> <imgsrc="icon.gif" hspace=240 vspace=140> </BODY></HTML>.

In this example, a map is requested from the map server "multimap.com" and is displayed as a background image, and the icon in the file "icon.gif" is overlaid at the center of the map. Preferably, in order to work correctly, this "map as background" technique should be implemented within a fixed-size frame.

When the user clicks on one of the subject buttons **6–9**, the client **10** establishes a connection to the information server whose URL is embedded in the button **6–9**. The client **10** sends an information request, as described above.

The information server **12** generates a list of the entries in its database having a longitude and latitude within the bounds specified, and uses them to create an information response, as described above. Each entry is associated with a displayable name and/or icon and optionally a longitude and latitude. The icons or text may be highlighted to show further information such as levels of availability, etc.

The client software normally overlays the displayable names and/or icons on its map.

The user has the option of opening one or more icons from the screen, normally by clicking on the displayable name. This passes the URL to the Web browser which opens it in the usual manner.

In FIG. **2**, the current location has been sent to three servers: one run by a high street bank, which returns the location of cashpoint machines, one by an independent hotel reservation system and one by a well-known fast food chain.

The result of the responses by the overlay servers **12** are shown in FIG. **2**, in which the same map is displayed with icons **13** representing the various facilities reported by the second server **12**, and hypertext links **14** to text pages or other Web facilities, in the usual way.

It should be noted that the client computer **10** may be used to transmit the information request with geographical data first. The overlay or information server **12** responds with information data, including coordinate data, relating to the requested services for example. This data, as well as being used to generate the display on the client computer **10**, can be used to formulate the map request including coordinate data for transmission by the client computer **10** to the map server **11**. The map server **11** then responds with the map data, which is then transmitted to the client computer **10**. The map can then be displayed on the client computer visual display unit and overlaid with graphics representing the information data. In other words, either the map request or the information request can be formulated first for transmission to the appropriate server **11,12**.

The architecture of the preferred system is such that it can support a movable map window. A user can scroll North, South, East or West on the screen and see more detail appear, and can zoom in and out for more detail or for a wider perspective using the zoom and move buttons **4**. This also enables a moving display, such as a hand-held device or a rolling map installed in a car, to be dynamically updated with new locations as the displayable window moves over them.

Although the client computer **10** may be a stationary PC connected to the Internet, the architecture is designed to support mobile clients such as car navigation systems and personal digital assistants (PDAs). The client software preferably supports direct connection to Global Positioning System (GPS) receivers, and preferably implements the NMEA 0183 standard for exchange of navigational data. If the client is also a cellular telephone, it preferably supports the transfer of information derived from the cellular network. In a preferred embodiment, the client transfers its own position to the information server and map server within the HTTP protocol by adding an HTTP header line to its request messages. In the case that the client is connected to a GPS receiver and therefore knows its exact location, it can add an HTTP header line as follows: remote_position: lon="-0.1666"; lat="51.545". In the case that the client does not have its exact position, but does have access to the name of its nearest cellular base station, it can add an HTTP header line as follows: remote_cellname: LONDON-SW-5. A map server or information server which maintains data on the locations of cellular base stations can convert the cell name to a location and deliver the appropriate map and/or overlay information. In the case that the client is not able to add HTTP header lines as described above, location and/or cell names may be transmitted within other HTTP headers or within the HTML protocol, but such embodiments are not considered preferable. It is important to note that the client will often request information on a location other than its own current location, and that the location of interest is transferred within the Map Request/Information Request URLs, while the client's own location is transferred in the HTTP header. This combination allows the server computers to implement a wide range of additional functions, such as displaying the distance from the current location to the location of interest. In the case that the client's location is known to be changing, such as a cellular phone connected to a GPS receiver, the screen display may be refreshed on a regular basis to show the client's current location. This refresh may be achieved by using the "refresh" function within the HTTP/HTML protocols, or it may be achieved using the local programmability of the client.

It is particularly preferred that the additional functionality provided within the World Wide Web, and its architecture, is built within the extensible framework of HyperText Markup Language (HTML) and the HyperText Transfer Protocol (HTTP). The extensions to HTML/HTTP are thus preferably entirely compatible with existing Web standards and do not seek to modify or replace any part of the Web architecture.

In a preferred embodiment, the functionality described above is added to the client computer **10** by providing additional software for a known Web browser (for example, Netscape, Mosaic, etc.). This software may be implemented as separate programs (i.e. a "helper application"), or as plug-in programs that execute within a browser program, or as Java Applets which are downloaded and executed as required.

Alternatively, a subset of the full functionality may be implemented using the browser's standard display and positioning capabilities only. An.implementation of the latter case requires greater functionality in the information server, and is a preferred implementation in circumstances where it is difficult or impossible to add functionality to the client browser.

The server computers **11,12** may employ well-known standard database tools in conjunction with known Web server packages, in order to recognise the requests and generate the responses described above.

Another important feature of the present invention is that maps and overlay information can be "persistent". That is, pointers to maps or places can be stored in databases on the